ECONOMETRICS II, FALL 2023

Homework 2. Due Wednesday September 6.

1. Continue the first question of Homework 1. For the probit model that you estimated. calculate the standard errors of the estimated parameters in three different ways and compare: Using the Hessian (calculated analytically), using the Hessian calculated numerically, using the Outer Product of the gradients. Are they similar? Compare for a small sample and for a longer sample.

2. Find the Score and Hessian for an exponential distribution and verify the information matrix equality. (Feel free to look up the variance for the exponential.)

3. Consider an estimate $\hat{\theta} = (\theta_1, \theta_2)'$ with variance-covariance matrix

$$\Sigma = \begin{pmatrix} 3 & 0 \\ 0 & 2 \end{pmatrix}.$$

i) Write down (calculate the one dimensional test-statistic) the Wald test for the hypothesis $\{\theta_1 = \theta_2\}$.
ii) Write down the Wald test for the hypothesis $\{\log \theta_1 = 1; \theta_2 = 2\}$.